



Meghraj Group

Investment Banking | Fiduciary Services | Infrastructure Consulting

Evolving role of Mini-Grid Projects in India

June 29, 2018

Meghraj Group Services

	INVESTMENT BANKING ADVISORY SERVICES	FIDUCIARY SERVICES		INFRASTRUCTURE CONSULTING
Company	Meghraj Capital	Minerva Group	MTC Trust & Corporate Services	Meghraj Capital Advisors
Services	<ul style="list-style-type: none"> • M&A and strategic advisory • Equity raising • Debt raising • Real estate financing 	<ul style="list-style-type: none"> • Offshore trust services • Onshore trust services • Corporate services • Corporate trust services • Fund administration 	<ul style="list-style-type: none"> • Onshore trust services • Corporate services • Corporate trust services 	<ul style="list-style-type: none"> • Policy & regulatory advisory • PPP advisory • Investment promotion • Feasibility studies • Institutional strengthening
Offices	<ul style="list-style-type: none"> • Kenya • UK • India • Japan • Dubai • USA 	<ul style="list-style-type: none"> • Jersey • UK • Switzerland • Mauritius • Dubai • Singapore 	<ul style="list-style-type: none"> • Kenya 	<ul style="list-style-type: none"> • India • Kenya
Clients	<ul style="list-style-type: none"> • Private & public sector companies • High net worth individuals/ family offices • Financial institutions • Investors 	<ul style="list-style-type: none"> • High net worth individuals/ family offices • Private sector companies • Fund managers 	<ul style="list-style-type: none"> • High net worth individuals/ family offices • Private sector companies • Banks • Financial institutions 	<ul style="list-style-type: none"> • Private & public sector companies • Local and central governments • Development finance institutions
Team Size	• 30	• 170	• 10	• 30



Meghraj Group Offices & Core Markets

CORE MARKETS

- Investment Banking Offices
- Fiduciary Services Offices
- Infrastructure
- Consulting Offices



Team Geographical Experience

Our team members have **hands-on experience of working on international infrastructure assignments in 32 countries** , in addition to **more than 25 States in India**



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Role of Mini-Grid Projects with improvement in Grid

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24x7 scenario

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Models for grid-interactive Mini-Grid Projects

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Subsidy models for ensuring affordability



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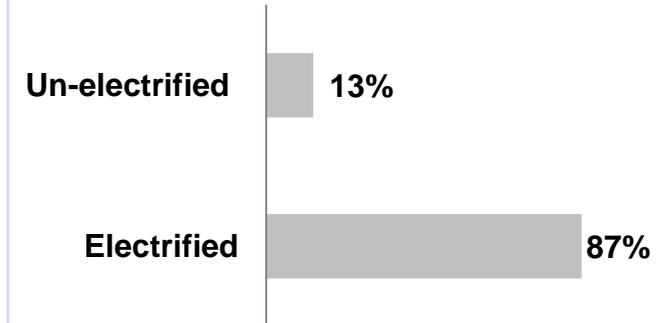
Electrification status in India & UP

India has achieved **complete village electrification** in April, 2018



UP is marching towards **complete household electrification by 2019**

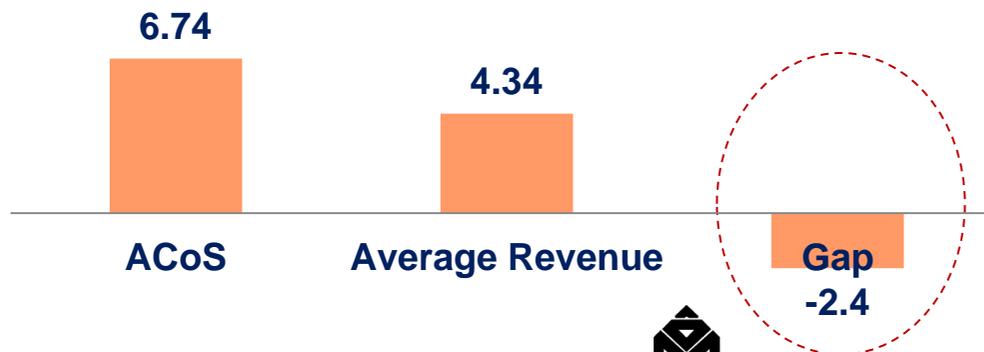
Household electrification in India



Source: Saubhagya dashboard; dated June 28, 2018

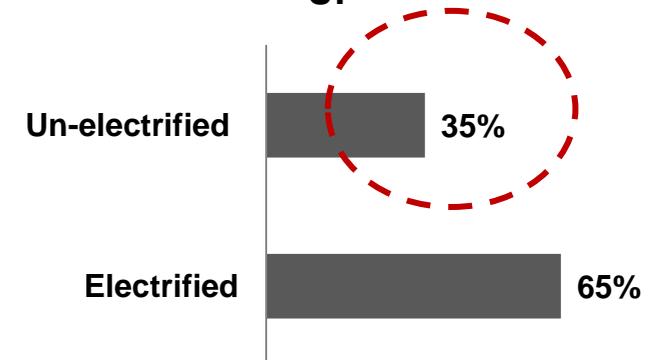
Discoms in UP suffer **loss of INR 2.40/unit** for supplying electricity to domestic consumers

Per unit loss (INR/unit) to Discom for supply to Domestic consumers in UP



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Household electrification in UP

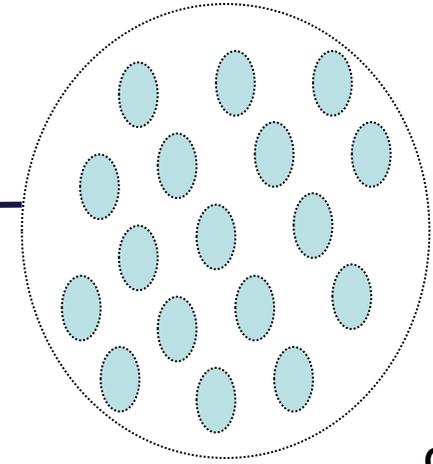


Conventional mode of operations for Mini-Grid Projects

MGO implements **Mini-Grid project** for **generation & supply** of **electricity** through PDN in areas where **Distribution Licensee's System** doesn't exist

RE generating plant

PDN



Consumers



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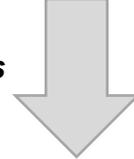
Subsidy models for ensuring affordability



Transition in Mini-Grid Project operations with grid improvement



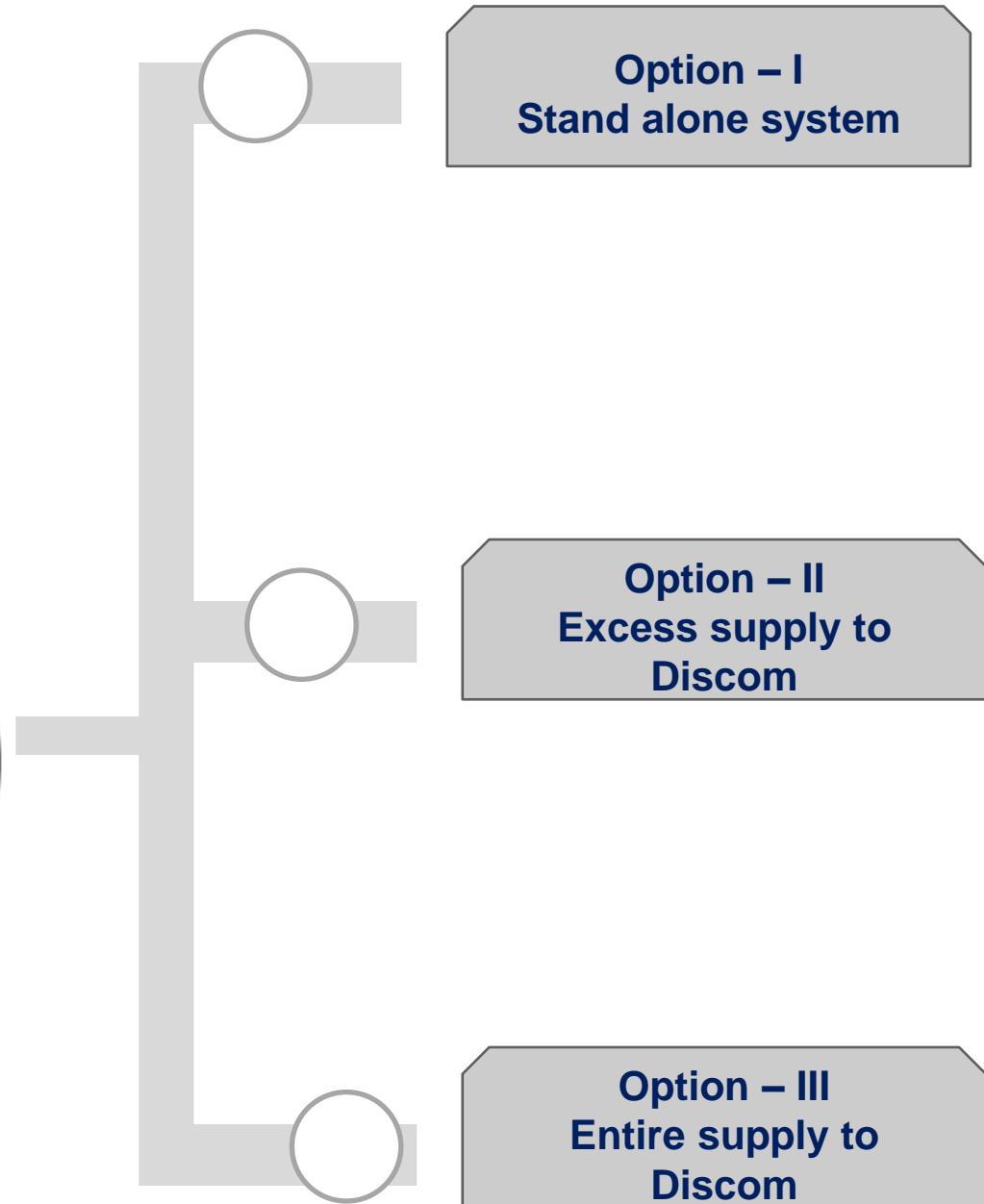
*Supply to consumers
from Mini-Grid Projects*



*Grid
improvement*

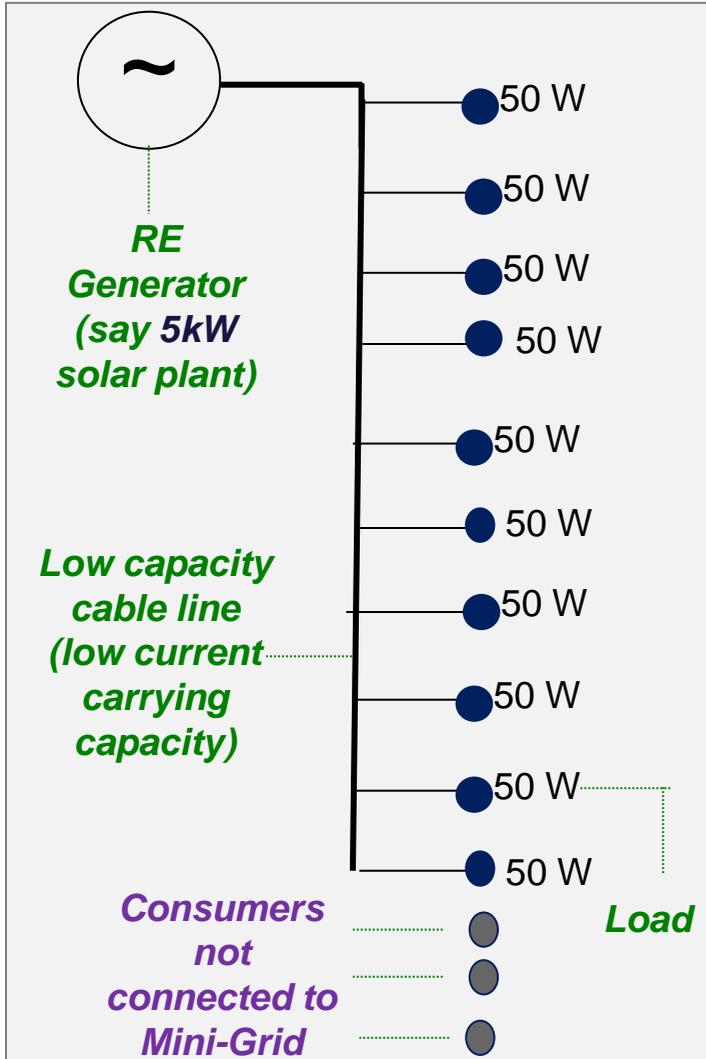


Business Cases



Stand alone operations of Mini-Grid Projects in electrified areas

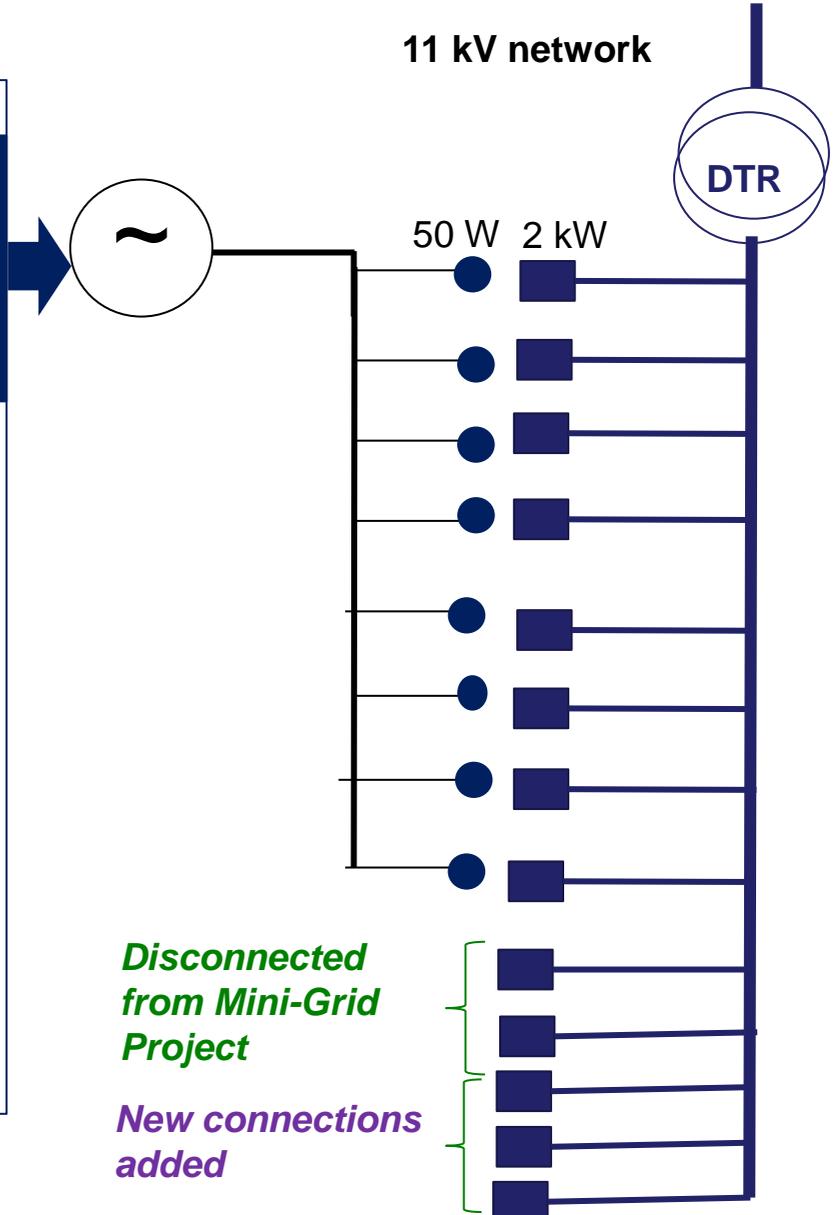
Mini-Grid Project



Grid arrival/ Grid improvement

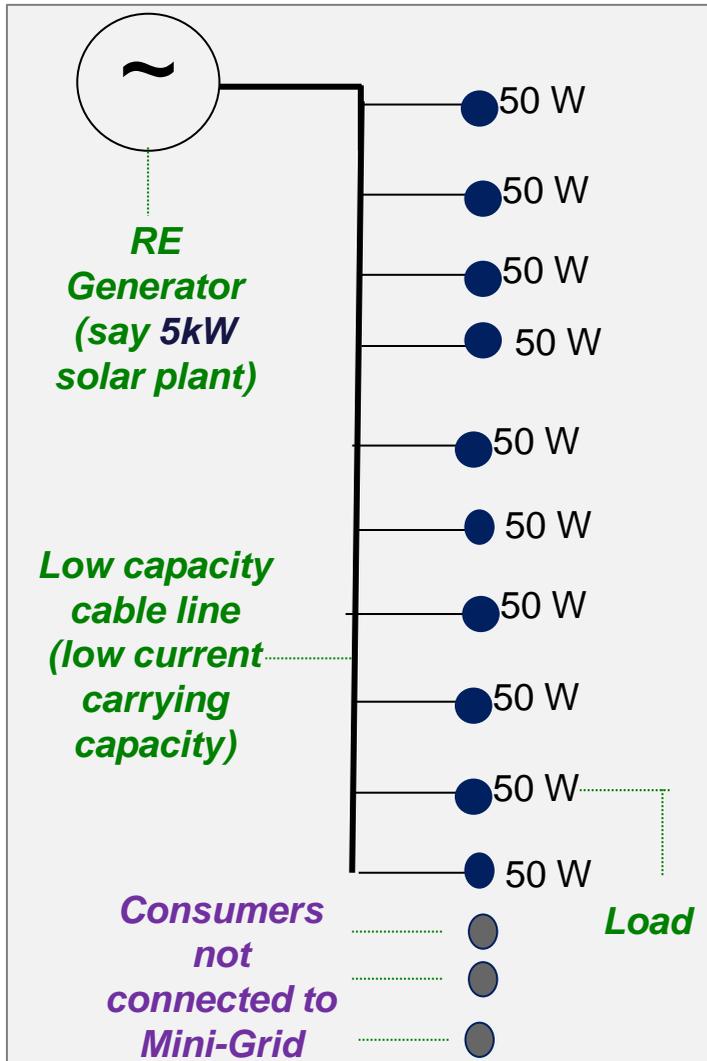
OPTIONS

Continue to supply to its consumers & exist in parallel with the grid



Excess supply to grid from Mini-Grid Project

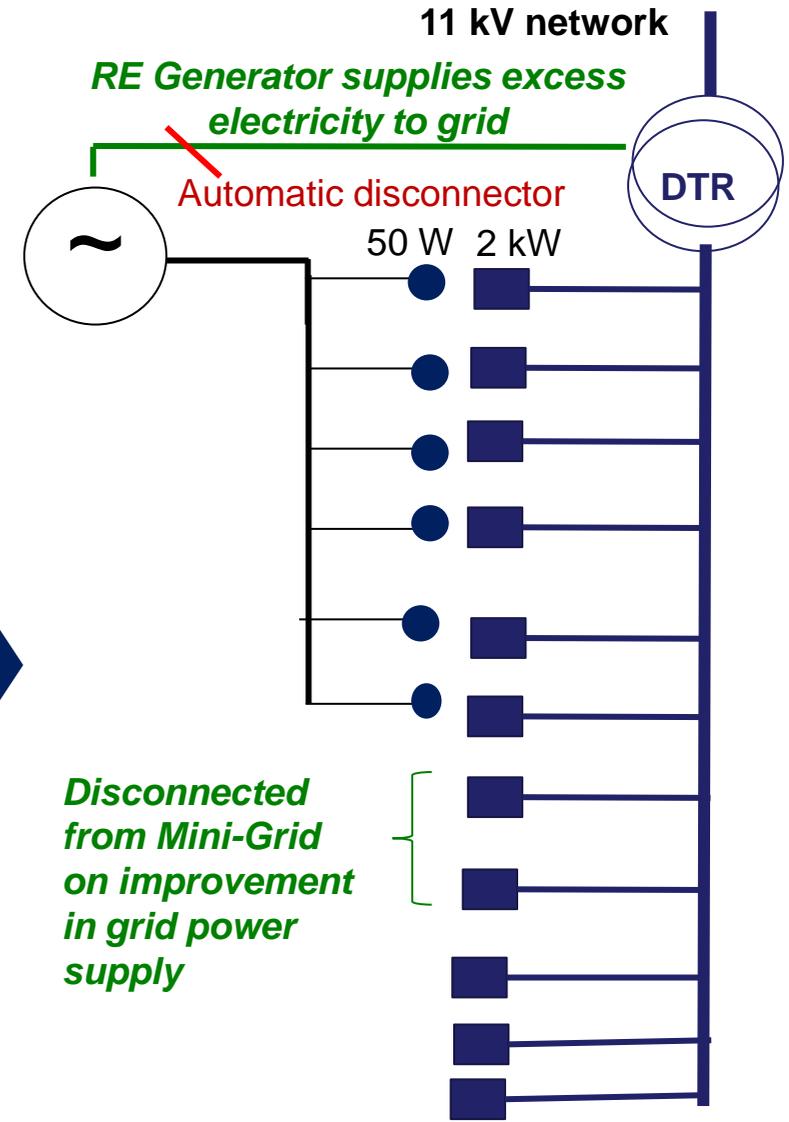
Mini-Grid Project



Grid arrival/ Grid improvement

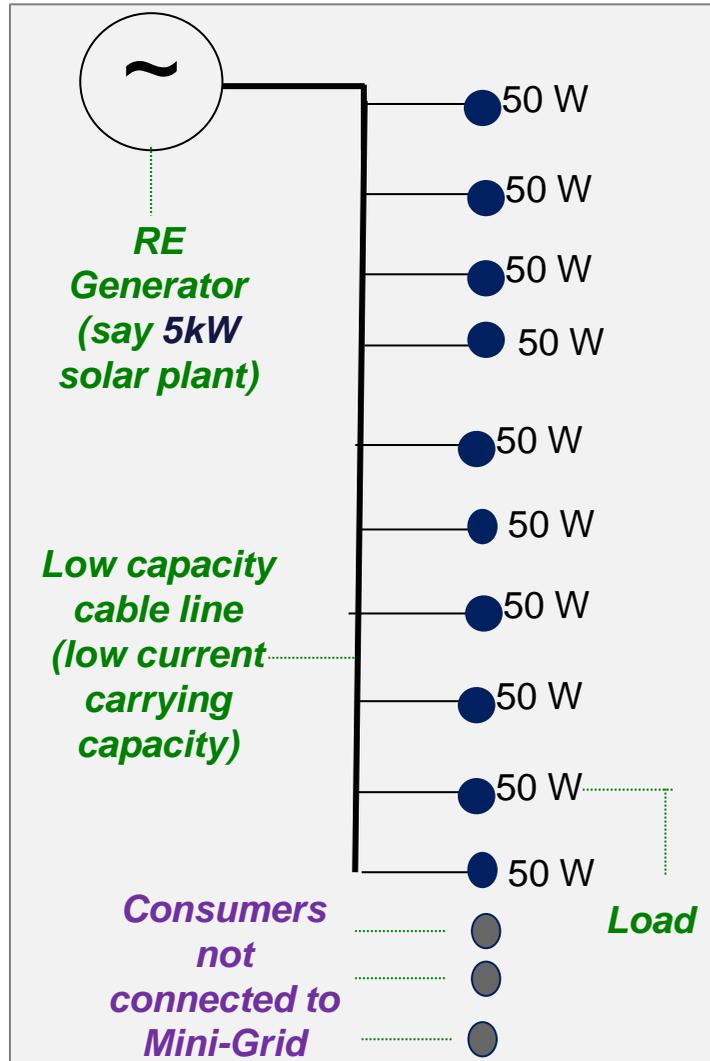
OPTIONS

Continue to supply to its consumers and sell excess electricity to the grid at interconnection point



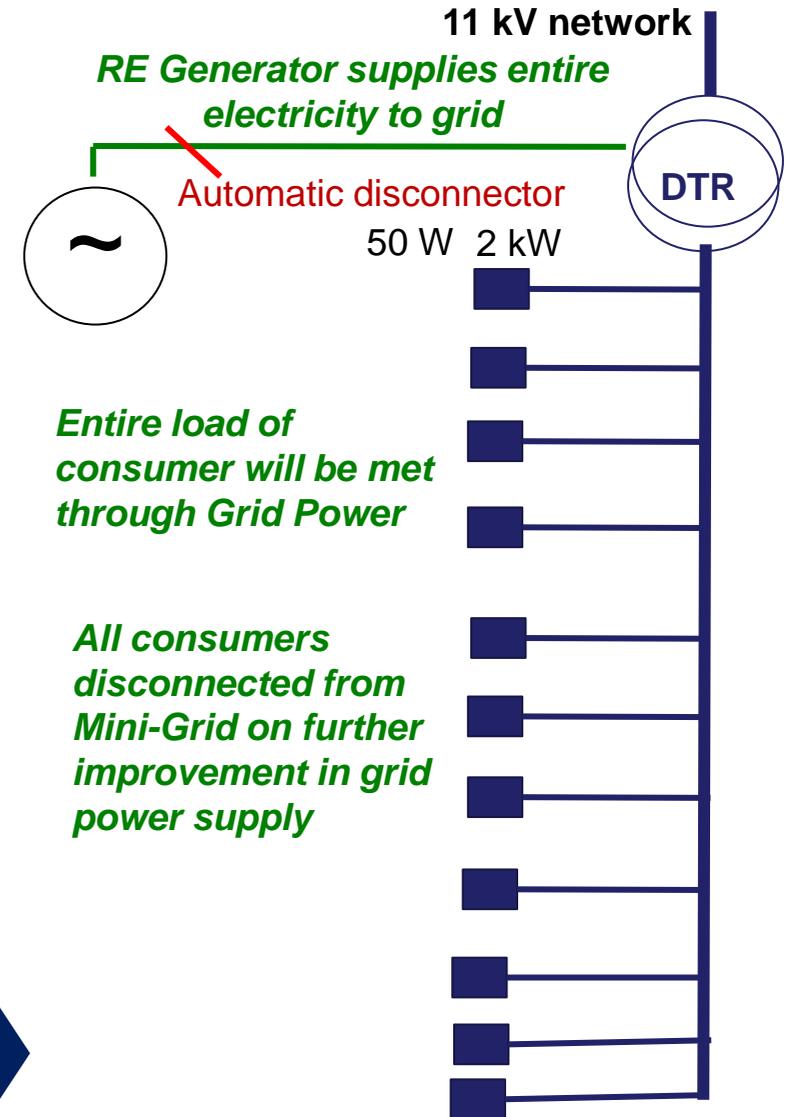
Entire supply to grid from Mini-Grid Project

Mini-Grid Project



OPTIONS

Supply all electricity to the grid at interconnection point



RE generator supplies exclusively to the Grid

Progressing towards grid interactive Mini-Grid Projects

On a project funded by Shakti Sustainable Energy Foundation, MCAPL is working towards **pilot interconnection of Mini-Grid Projects in UP**

Atrauli, Hardoi, UP



Meters have been installed at DTRs near Mini-Grid Projects to **assess consumer loading & capacity for interconnection of Mini-Grid Projects**

Pipargaon, Hardoi, UP



There may be a need to allow **bi-direction supply** of electricity for improved consumer load management in future



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Discom's plan of 24*7 may not be achieved in near future; thus tail end DRE has role to play

Parameters	Units	Discom*
		Current scenario (with around 18 hrs of supply only)
Customers	Numbers	4,136
Connected Load	kW	9,047
Units supplied (Input Energy)	MU	6.6
Distribution Losses	%	37%
Units billed	MU	4.13
Collection Efficiency assumed	%	42%
Revenue collected	INR Lacs	53.95
O&M Expense	INR Lacs	21.45
Net Thru Rate to Discom per unit (without factoring in power purchase cost)	INR/unit	0.49

- With this thru rate Discoms will find it tough to provide 24*7 power in rural areas.
- Losses of Discoms will increase because of addition of new consumers

So tail end DRE will have a role to play



Modes to achieve 24x7 power for all consumers in UP

Modalities to achieve 24x7 reliable & cost effective supply to consumers



Discom improves supply

- ⊕ Discom sources electricity from present sources and/or enters into PPA with new plants for supply
- ⊕ Increased burden on Discoms with each unit of electricity supplied in rural areas,
- ⊕ Prone to transmission & distribution losses upon wheeling of electricity to last mile consumer,
- ⊕ Stagnant efficiencies & losses
- ⊕ Unnoticeable improvement in Through Rate
- ⊕ Increased manpower costs



Avails support of MGO in supply & grid management

- ⊕ Discom appoints MGO to supply electricity from Mini-Grid Project,
- ⊕ Discom also allocates responsibility of grid management to MGO,
- ⊕ MGO generates electricity from Mini-Grid Projects & supplies to Discom
- ⊕ MGO also undertakes Metering, Billing, Collection for Discom,
- ⊕ MGO reduces losses & improves efficiencies of Discom,
- ⊕ Avoidance of power purchase costs from conventional generating sources for Discom



Illustrative – Improvement in Through Rate for Discom under scenarios

Scenario	Year wise Through Rate realised (INR/unit)														
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Scenario 1 Discom continues to supply for 18 hours as per rural schedule	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Scenario 2 Discom improves supply to 22 hours	0.12	0.28	0.39	0.68	0.84	1.02	1.02	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Scenario 3 Discom supplies 22 hours & MGO supplies 2 hours using load limiters with grid management	0.25	1.31	1.24	1.50	1.48	1.49	1.48	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49
Scenario 4 Discom supplies for 18 hours & MGO supplies for 4 hours using load limiters with grid management	0.01	0.54	0.38	0.75	0.87	1.04	0.99	1.15	1.07	1.11	1.09	1.10	1.09	1.10	1.10



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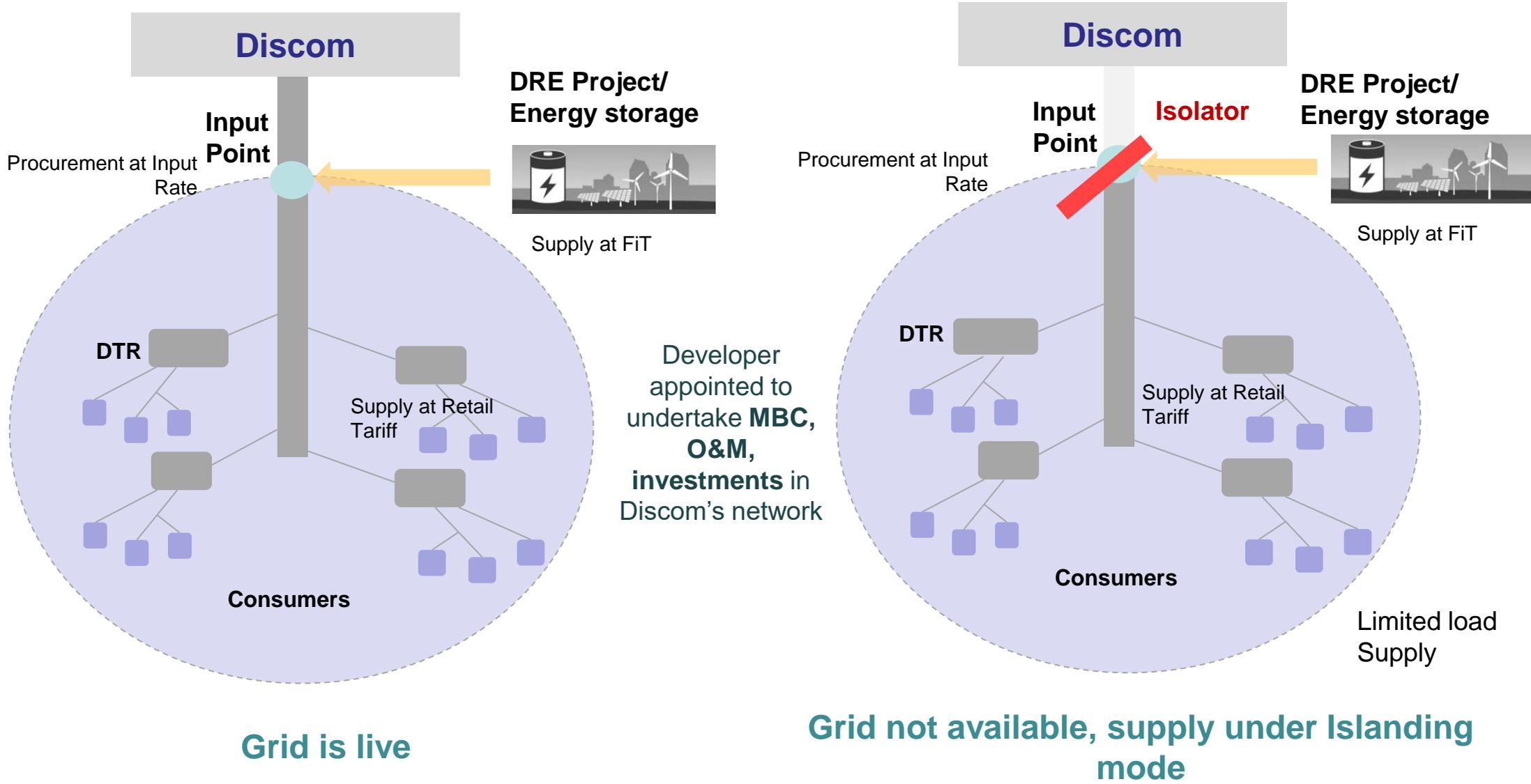
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Grid interactive Mini-Grid Projects with distribution management

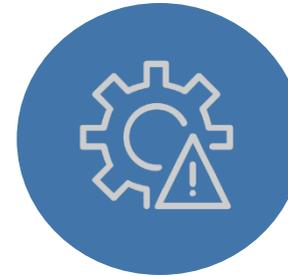


Potential benefit and key challenges of the construct



Benefits

- ⊕ Improved revenue realization for Discom
- ⊕ Support in effective fulfillment of Universal Service Obligation (USO)
- ⊕ Reduced AT&C losses for Discom
- ⊕ Reduced operational costs for Discom
- ⊕ Support in achieving RPO for Discom
- ⊕ Reliable electricity supply to consumers
- ⊕ Business viability for Project developer



Challenges

- ⊕ The model can be implemented once the regulatory framework is developed
- ⊕ Tariff to be charged by Mini-grid player is not reflective of DRE cost, rather based on retail tariff order
- ⊕ Non-existence of Policy/Regulations in majority of states
- ⊕ Undefined areas/potential by Central/State Govt.

MCAPL on a project funded by **Shakti Sustainable Energy Foundation**, is exploring opportunities of **integrating DRE projects with Discom's grid to improve supply & support in grid management**



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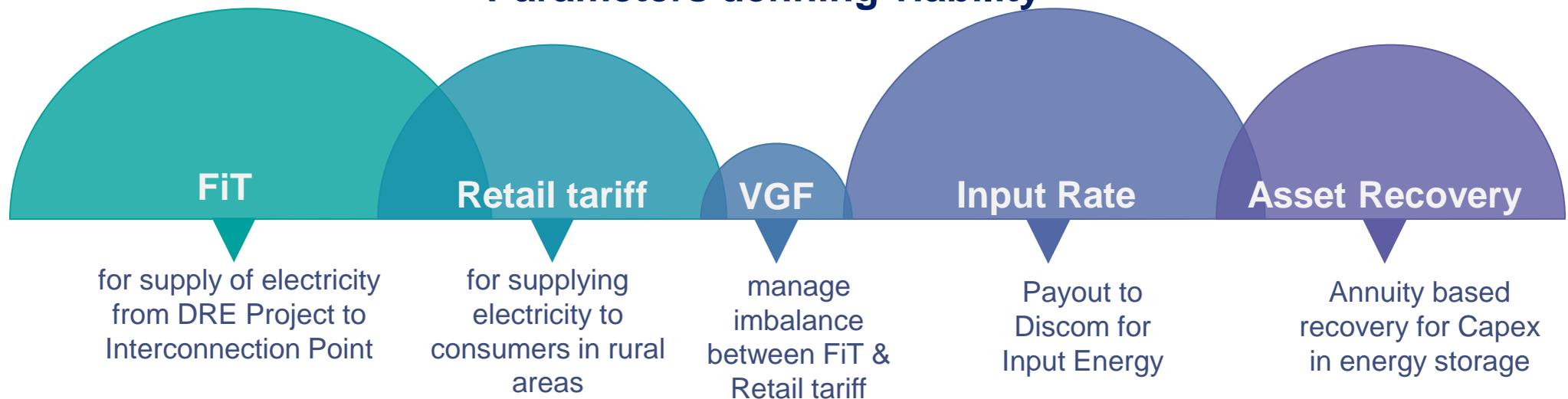


Parameters to ensure viability of Mini-Grid Projects

Activities

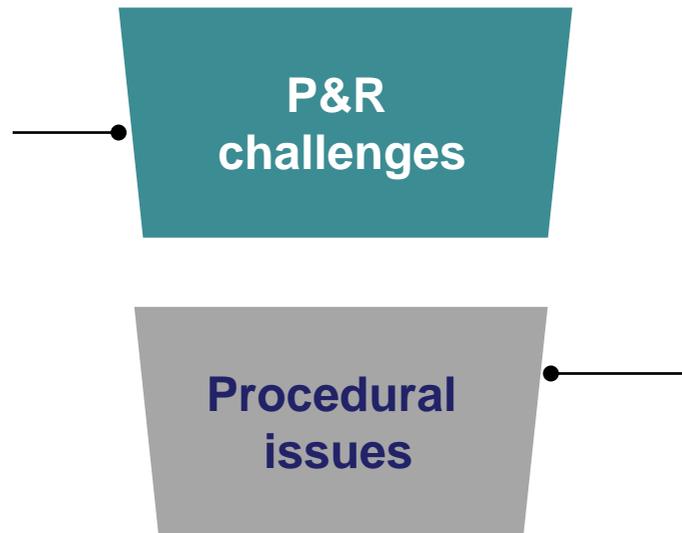
- **Implement DRE Project** (with energy storage) and interconnect with Discom's network at Inter-connection Point,
- **Procure electricity from Discom** at Input Point at Input Rate,
- **Supply electricity to consumers** in allocated area,
- **Metering, Billing, Collection** of consumers in allocated area,
- **O&M** of Discom's network, & **investments** in Discom's network – new connection, pole, service line, etc.; rest investments, Discom to undertake (such as DTR, Sub-station, 11kV feeder, etc.),
- **Supply to consumers** under **islanding** mode through **load limiters** with limited load

Parameters defining viability



Issues associated with Mini-Grid sector in India

- **Non-availability of Policy** at central level and in majority most of states,
- Despite of **National Tariff Policy, 2016 mandating** states to come up with **Mini-Grid Regulations**, only **selective states have notified**;
- **Lack of financial support** in form of subsidy/central financial assistance available to sector,
- ,
- Project **implementation procedure not defined** at central/state level,
- **Unviable retail tariffs** for sale of electricity from Mini-Grid Projects in few states for sale to Consumers/Discoms
- **Lending facility limited to large scale project**



- Applicable **approvals/clearances & exemptions are not defined**,
- **No clarity on business viability** upon **grid arrival** in few states
- **Non-existence of technical details** for implementation of Mini-Grid Projects at central level,
- Due to non-existence of policy at central level, **cost of funding is higher**,
- Due to **small size & infirm** nature of electricity, **reluctance from Discoms to interconnect projects**



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